



# Agilent Instrument Control Framework and Agilent 1260 Infinity Bio-inert Quaternary LC with Thermo Fisher Chromeleon

## Technical Overview

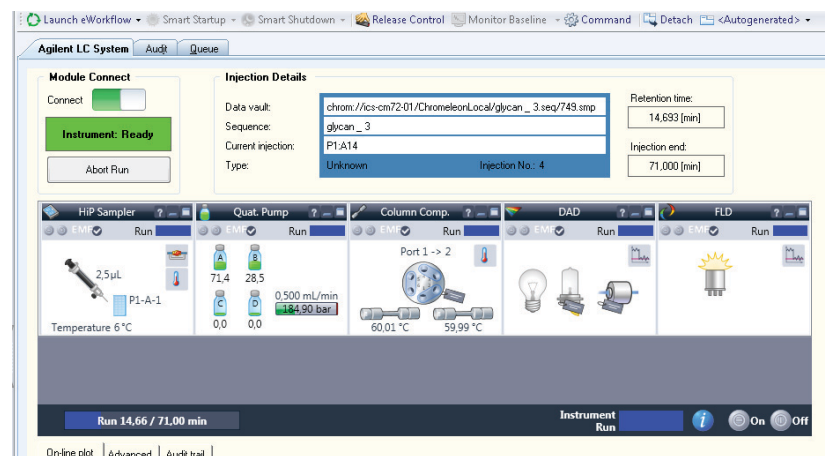
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### Abstract

The Agilent Instrument Control Framework (ICF) enables third-party LC data acquisition and processing software providers to simplify the development of instrument control software for Agilent LCs. Thermo Fisher Chromeleon Version 7.2., in combination with Agilent ICF A.01.05 SP 1, delivers enhanced control functions for all Agilent 1100, 1200, and 1200 Infinity Series LC systems.

In this study, the Agilent 1260 Infinity Quaternary Bio-inert LC was connected to the Thermo Fisher Chromeleon 7.2 architecture. Almost all instrument features were accessible by combining ICF and Chromeleon software, including injector programming, alternating column regeneration with a second pump, or acquisition of up to eight DAD signals.



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## Introduction

Agilent introduced the Instrument Control Framework (ICF), a software component, making it faster and easier for third-party software to enable and control Agilent liquid chromatography systems in chromatographic data systems or workstations<sup>1,2</sup>. Based on new standard instrument drivers from Agilent, ICF eliminates much of the delay and effort of using low-level instrument control codes for software developers who write their own native drivers.

The Agilent 1260 Infinity Quaternary Bio-inert LC was connected to the Thermo Fisher Chromeleon data acquisition and evaluation software. Precision data for areas and retention times were obtained.

## Experimental

The instrument used was an Agilent 1260 Infinity Quaternary Bio-inert LC, equipped with the following modules:

- Agilent 1260 Infinity Bio-inert Quaternary Pump (G5611A)
- Agilent 1260 Infinity High performance Bio-inert Autosampler (G5667A)
- Agilent 1290 Infinity Thermostat (G1330B)
- Agilent 1290 Infinity Thermostatted Column Compartment (G1316C) with bio-inert solvent heat exchangers (G5616-81000)
- Agilent 1260 Infinity Fluorescence Detector (G1321B), equipped with bio-inert standard FLD flow cell

## Conditions

Parameter	Value																																				
Column	Agilent AdvanceBio Glycan Mapping, 2.1 × 150 mm, 2.7 μm (p/n 683775-913)																																				
Compounds	GLYKO 2-AB-(MAN-5) > M5, 100 pmol GLYKO 2-AB-(NA2) > A2G2, 100 pmol GLYKO 2-AB-(A1) > A2G2S1, 100 pmol GLYKO 2-AB-(A1F) > FA2G2S1, 100 pmol GLYKO 2-AB-(A2) > A2G2S2, 100 pmol All 2-AB-labeled glycan standards were purchased from Prozyme, Hayward, USA.																																				
Mobile phases	A) Acetonitrile B) 100 mM ammonium formate, pH 4.5																																				
Gradient	<table border="1"><thead><tr><th>Time (min)</th><th>% B</th><th>Flow rate (mL/min)</th></tr></thead><tbody><tr><td>0</td><td>15</td><td></td></tr><tr><td>5</td><td>25</td><td></td></tr><tr><td>35</td><td>36</td><td></td></tr><tr><td>40</td><td>50</td><td></td></tr><tr><td>42</td><td></td><td>0.5</td></tr><tr><td>42.01</td><td></td><td>0.25</td></tr><tr><td>43</td><td>100</td><td></td></tr><tr><td>48</td><td>100</td><td></td></tr><tr><td>50</td><td>15</td><td></td></tr><tr><td>50.01</td><td></td><td>0.25</td></tr><tr><td>51</td><td></td><td>0.5</td></tr></tbody></table>	Time (min)	% B	Flow rate (mL/min)	0	15		5	25		35	36		40	50		42		0.5	42.01		0.25	43	100		48	100		50	15		50.01		0.25	51		0.5
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51		0.5																																			
Stop time	71 minutes																																				
Column temperature	60 °C																																				
Injection volume	2.5 μL																																				
FLD	Ex 260 nm; em 430 nm; PMT 10; data rate 18.52 Hz																																				

## Results and Discussion

With ICF, it is possible to support Agilent instrument features that were not supported with previous Chromeleon versions using native Thermo Fisher drivers. In particular, all features are now supported that are available in the Agilent Instrument Status ON-LINE and method screens, which is added to the existing Chromeleon screens (Figure 1 and front picture).

### Performance of the Agilent LC systems using Thermo Fisher Chromeleon data-processing tools

To demonstrate that the 1260 Infinity Quaternary Bio-inert LC fulfills the expected performance, the precision of retention time and areas for glycan standards were assessed. Figure 2 shows the chromatogram of a glycan standard sample. Precision of retention times and areas for a 2.5-μL injection are combined in Table 1. Data were evaluated using the Chromeleon peak summary report. The precision for the retention times for three consecutive runs was < 0.5 % RSD and for the area the precision was < 5.9 % RSD.

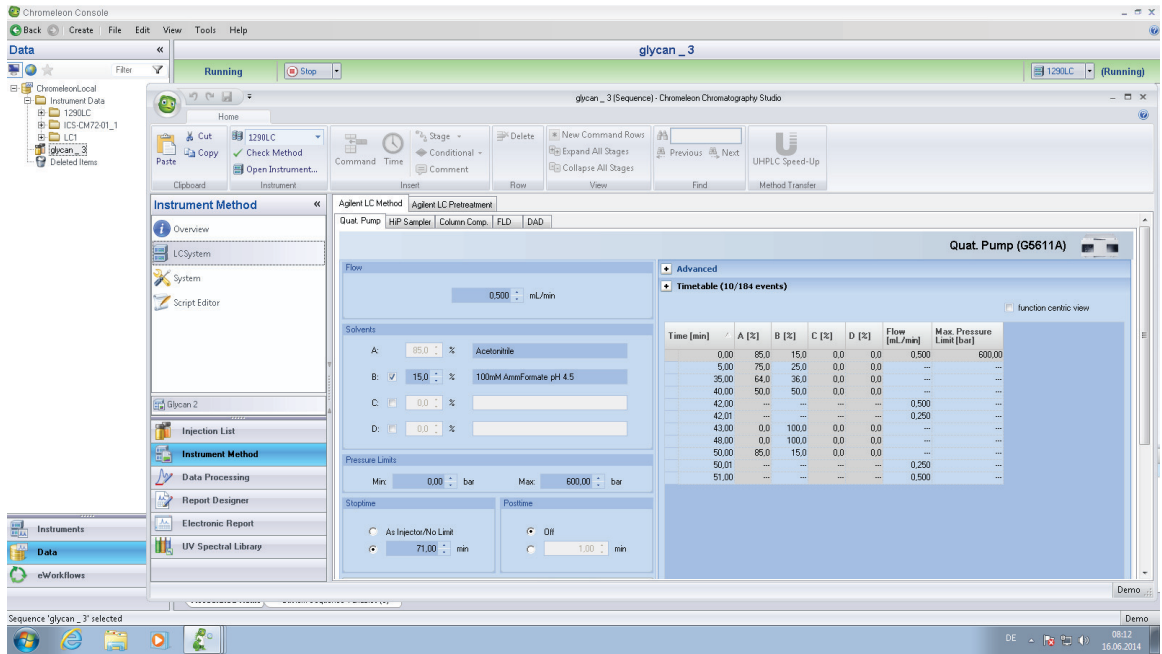


Figure 1. Agilent instrument method screen in Chromleon 7.2.

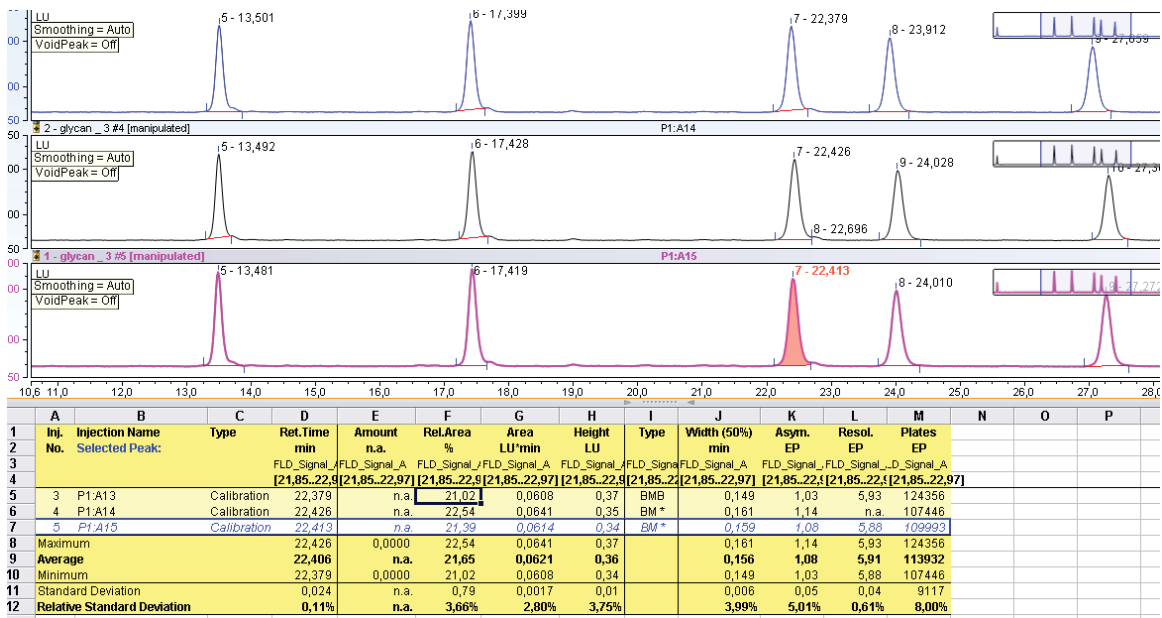


Figure 2. Chromatogram of glycan sample with peak table for evaluation of retention time and area precision.

## Conclusions

The Agilent Instrument Control Framework is a software component, making it faster and easier for third-party software to enable and control Agilent liquid chromatography systems in chromatographic data systems or workstations. In this example, the ICF software was used to control the Agilent 1260 Infinity Quaternary Bio-inert LC in combination with Thermo Fisher Chromeleon software. The instrument was configured in Chromeleon, and data were acquired and processed. The combination of ICF A.01.05 SP 1 software and Thermo Fisher Chromeleon 7.2 allowed access of almost all Agilent instrument features such as injector programming, external needle wash, alternating column regeneration with a second pump, and more. The Agilent instrument status screen was used to set up online methods, to switch the system on or off, to equilibrate columns, to view the status of single modules, and to access special features using the Control function available for each Agilent LC module. As expected, the 1260 Infinity Quaternary Bio-inert LC showed the same excellent performance for data acquisition and process using Chromeleon and ICF software as delivered by Agilent ChemStation.

## References

1. Anon. The Agilent Technologies Instrument Control Framework, *Agilent Technologies Technical Overview*, publication number 5990-6504EN, **2010**.
2. Anon. The Agilent Instrument Control Framework (ICF): A short introduction for end users of Agilent HPLC instrumentation as well as third party instrument control providers, *Agilent Technologies Data Sheet*, publication number 5990-5756EN.

Table 1. Precision of retention times and areas for three consecutive runs.

Compound	RSD RT (%)	RSD area (%) (2.5 µL inj. vol)
GLYKO 2-AB-(MAN-5)	0.07	5.89
GLYKO 2-AB-(NA2)	0.09	2.56
GLYKO 2-AB-(A1)	0.11	2.80
GLYKO 2-AB-(A1F)	0.26	2.49
GLYKO 2-AB-(A2)	0.49	1.30

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